USDA

**United States
Department of
Agriculture**

Service Center
Initiative
(SCI)

Standard for Geospatial Data Set Metadata

Prepared by
Data Management Team #5: Geospatial Data Standards

Abstract: This standard represents the minimum mandatory metadata elements that are required for all geospatial data sets produced by the USDA Service Center Initiative. The objective of the standard is to provide a common set of terminology and definitions for the documentation of digital geospatial data sets that will enable users to obtain consistent information concerning the availability and fitness of use of a particular data set.

Keywords: geospatial data, metadata, standard

Published and distributed in August 31, 1999
(Revision of Initial Draft 6 Service Center Geospatial Data Set Metadata Standard, June 1999)

Document number: SCI Std 003-01

Introduction

(This introduction is not part of SCI Std 003-01, Standard for Geospatial Data Set Metadata.)

The Service Center Initiative (SCI) Data Management Team #5: Geospatial Data Standards developed the August 1999 revision of the *Standard for Geospatial Data Set Metadata* to guide data producers and data stewards in the proper documentation of metadata for geospatial data sets that fall within the domain of their responsibilities. This standard describes the required metadata elements that shall be collected for data sets produced under the SCI.

The individuals who contributed to the development of this guide are:

David Anderson, (NRCS) Service Center Data Team Leader
Carol Ernst, (FSA) Co-Leader
Emil Horvath, (NRCS) Co-Leader

Liz Cook (NRCS)	Tom McCarty (SAIC)	Lee Stieger (FSA)
Randy English (NRCS)	Jill Schuler (NRCS)	Kent Williams (FSA)
David Feld (RD)	Nicole Soltyka (SAIC)	

Figure 1—Working group list

ARC/INFO is a registered trademark of Environmental Systems Research Institute, Inc.

Table of contents

This page is intentionally left blank.

STANDARD FOR GEOSPATIAL DATA SET METADATA

1.   Overview

This standard establishes the minimum mandatory metadata elements that shall be collected for all geospatial data sets created by the Service Center Initiative (SCI). Members of the Data Management Team (DMT), Technical Working Group 5 (TWG 5) on Geospatial Data Standards are available for technical assistance and guidance during the application of this standard. This document provides complete descriptions for each of the minimum mandatory metadata elements, acceptable domain values where appropriate, and examples relevant to the application of this standard for geospatial data sets produced within the SCI.

1.1.   Scope

The scope of this standard identifies each of the minimum metadata elements that shall be collected for geospatial data sets. This document discusses the role of the Federal Geographic Data Committee (FGDC) in the development of this standard and how the SCI will accommodate new standards and their subsequent implementation. The draft standard is outlined in Clause 4 and includes complete descriptions of each metadata element.

1.2.   Purpose

This purpose of this standard is to document the minimum mandatory metadata elements that shall be collected for all data sets produced by the USDA Service Center Initiative (SCI). This standard serves as a reference tool for persons responsible for the collection and management of metadata. Adherence to this standard is necessary to ensure that all geospatial data sets produced and maintained within the SCI are, at a minimum, documented to a consistent and manageable level of detail. This consistent documentation is necessary in order to provide access to geospatial data sets for users within and outside of the SCI. A common set of elements allows the metadata to be included into national programs charged with tracking and maintaining the advertisement of available geospatial data sets. Metadata includes information about the geospatial data set such as identification information, contact information, details concerning the quality and spatial extent of the data, and information concerning availability and distribution, spatial reference, data quality, and production rules. This information allows users to determine the fitness of use of the data set for their application.

1.3.   Acronyms and abbreviations

APFO	Aerial Photography Field Office
ASPRS	American Society for Photogrammetry and Remote Sensing
CSDGM	Content Standard for Digital Geographic Metadata
DMT	Data Management Team
DOQ	Digital Orthophoto Quadrangle

FGDC	Federal Geographic Data Committee
GILS	Government Information Locator Service
GIS	Geographic Information System
GPS	Global Positioning Systems
ISO	International Standards Organization
NAD	North American Datum
NSDI	National Spatial Data Infrastructure
NSSADA	National Spatial Data Accuracy
OMB	Office of Management and Budget
RMSE	Root Mean Square Error
SCI	Service Center Initiative
SPCS	State Plane Coordinate System
TC211	Technical Committee 211
TWG	Technical Working Group
USDA	United States Department of Agriculture
UTM	Universal Transverse Mercator

2.   Background

Executive Order 12906, "Coordinating Geographic Data Acquisition and Access: The National Spatial Data Infrastructure," was signed on April 11, 1994, by President Clinton. Section 3, Development of a National Geospatial Data Clearinghouse, paragraph (b) states: "Standardized Documentation of Data, ... each agency shall document all new geospatial data it collects or produces, either directly or indirectly, using the standard under development by the FGDC, and make that standardized documentation electronically accessible to the Clearinghouse network."

2.1.   Federal Geographic Data Committee (FGDC)

The current de facto standard for digital geospatial metadata is provided by the Federal Geographic Data Committee (FGDC) who have defined and approved the Content Standard for Digital Geographic Metadata (CSDGM) FGDC-STD-001-1998 [A1] Version 2 revised June 1998. This standard is the data documentation standard referenced in the executive order.

According to FGDC, the objectives of the standard are to provide a common set of terminology and definitions for the documentation of digital geospatial data. The standard establishes the names of data elements and compound elements (groups of data elements) to be used for these purposes, the definitions of these compound elements and data elements, and information about the values that are to be provided for the data elements.

The standard was developed from the perspective of defining the information required by a prospective user to address the following: the availability of a set of geospatial data, the fitness of the set of geospatial data for an intended use, the means of accessing the set of geospatial data, and to successfully transfer the set of geospatial data.

2.2.   International Standards Organization (ISO)

Most recently, the International Standards Organization (ISO) has convened Technical Committee 211 (TC211), Working Group 3 Geographic Information to work on Part 15 – Metadata standards. Currently, the ISO Standard, Project 15046-15 is under review by FGDC and other interested parties. The ISO metadata standard will supercede FGDC's work, by the Office of Management and Budget (OMB) directive, and will obviously become the more accepted metadata standard within the international Geographic Information System (GIS) community. However, this is not expected to happen until late 1999.

3.   Levels of compliance

Due to the timeframe for adoption and implementation of the ISO TC211 standard, it is necessary to move forward with an implementation of a geospatial metadata standard based on the FGDC CSDGM Version 2. Thus, it is recommended that the Service Center Data Management Team provide some level of compliance with this standard in their implementation of a geospatial metadata repository. This will allow for effective communication and integration with other geospatial data repositories or clearinghouses and for participation in the National Spatial Data Infrastructure (NSDI) program, until such time as the ISO standard is accepted and other metadata programs begin to migrate to the new standard.

This document defines three levels of metadata collection compliance. The Service Center Initiative minimum standard (SCI minimum), the FGDC minimum, and FGDC full compliance standard. Each of these levels are depicted in Figure 1 and defined for the purposes of this document.

3.1.   FGDC full compliance

FGDC full is defined as all mandatory, mandatory-if-applicable, and optional elements that may apply. Optional metadata elements are to be determined by the data steward or data producer and included if the element is recognized as applicable.

3.2.   FGDC minimum compliance

FGDC minimum is defined as those metadata elements that are considered mandatory. Mandatory metadata elements are those elements that shall be provided for all types of geospatial data sets.

3.3.   SCI minimum compliance

SCI minimum is considered to be the minimum mandatory metadata set to be included for all types of geospatial data produced by USDA SCI. This core minimum may be expanded to include additional FGDC metadata elements or FGDC extended elements. FGDC extended elements are metadata data elements, above and beyond the FGDC full that have been defined by the data producer, data steward, or user community in

conformance with FGDC guidelines for creating extended elements. It is recommended that the FGDC minimum level of compliance for SCI data sets be completed when possible.
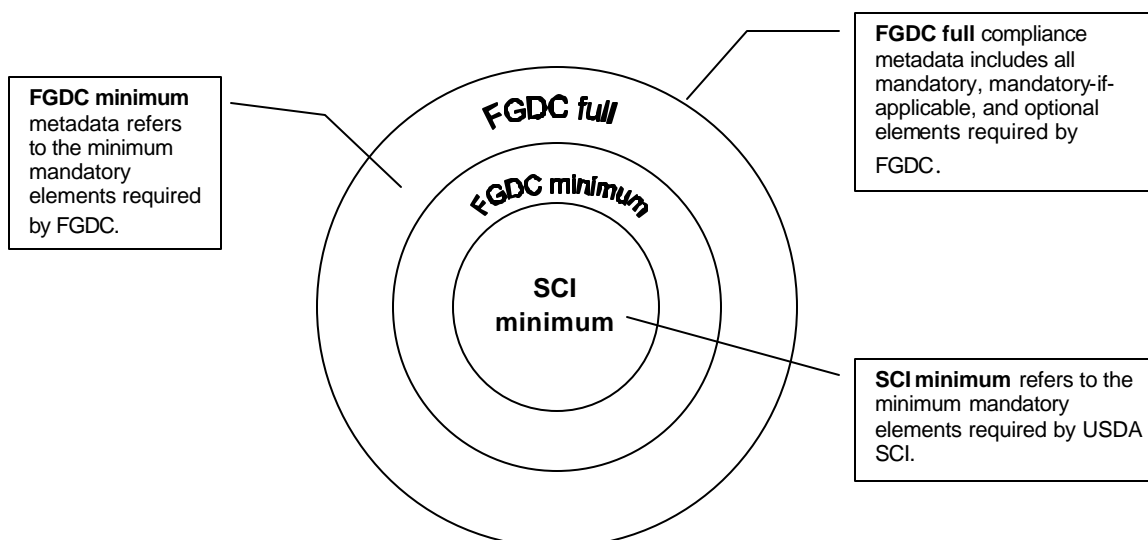

Figure 1—Metadata collection levels of compliance

The concentric rings in Figure 1 indicate that information inside the smaller ring is encompassed by information in the surrounding rings. For example, all metadata elements within the SCI minimum are contained within the FGDC minimum and the FGDC full. This does not preclude the data producer or data steward from including additional metadata elements into data set-specific standards but does ensure that there is a core minimum, or subset, that was extracted from the FGDC minimum.

All data sets produced by SCI are required to maintain, at a minimum (SCI minimum) the metadata elements outlined later in this document. The SCI recognizes that metadata collection efforts will vary from data set to data set, but adherence to the SCI minimum ensures that all SCI data sets document these same minimum required elements. Data stewards, working in conjunction with data producers, will assist with the appropriate selection of metadata elements that will be required for their respective data sets. This flexibility allows data stewards and data producers to collect information they deem valuable to the description of the data set, yet still collect enough information to ensure that the metadata is valuable for research and query purposes within a metadata repository or data clearinghouse environment.

3.4.   Adoption of SCI minimum

Conformance with the FGDC standard, in its entirety, is reasonably complex and probably costly and difficult to require. The Data Management Team recognizes that "The need to collect the proper amount and proper type of metadata must be balanced with the cost of collecting these properties." In other words, if the metadata requirements are too complex or burdensome, then the metadata won't be collected and therefore cannot be effectively used. Certainly, mandatory compliance with the entire FGDC full standard by all Service Center participants would be a formidable task.

Consequently, the Data Management Team recommends only requiring the collection and management of a core set of minimum metadata - which is "the minimum number of metadata properties that will allow for the successful sharing of metadata and data." This minimum mandatory subset of metadata will be compliant with the FGDC minimum and FGDC full standard in terms of its formats and element definitions but will not be fully compliant with FGDC's mandatory specifications.

Thus, the Data Management Team has established the Standard for Geospatial Data Set Metadata (SCI Std 009-01) and requires that this metadata, at a minimum, be provided and maintained with all SCI geospatial data at a data set level. However, the DMT intends to encourage, and will support technically through the use of metadata collection and maintenance tools, the submission and maintenance of the complete FGDC standard.

Service Center teams, currently using or involved in GIS, have been included in the review process to determine the minimum set of geospatial metadata which shall be required from an Agency perspective.

In trying to establish the minimum set of geospatial metadata, the Data Management Team first asked basic questions about a digital data set, or map, which a user would typically want to know. Next, these "criteria" were matched to the defined metadata components and elements within the ISO standard. The information presumed of interest was

- Where is the data (i.e., where on the surface of the earth is this data)?
- What place names are associated with the data (e.g., Larimer County)?
- What themes or layers are represented (e.g., hydrography or land use)?
- What type of data is it (e.g., vector or raster)?
- What is the quality of the data (e.g., how old is it, at what scale was it captured)?
- What coordinate system is the data in (e.g., UTM in meters)?
- How is the data attributed (e.g., what type of tags or related tabular data are there)?
- What do the attributes mean (e.g., 777 is a perennial stream)?
- In what format is the data (e.g., .DXF or ARC/INFO®)?
- Who can tell me more about this data (e.g., who is the data steward)?
- Are there any restrictions on the use or access of the data?
- Can I get the data online or in another media?

3.5. Metadata examples

Examples of fully populated metadata records as they will appear for Service Center data sets, are included in a separate document titled "Examples of Geospatial Metadata"[1].

---

[1] "Examples of Service Center Geospatial Metadata" is currently under development. A completed version will be available on the Data Management Web Site under the GIS Team heading located at:
http://207.140.79.15/SCIT+Knowledge+Base.nsf/aac7d56ca8fd884b852563be00610639?OpenView

Note that the examples included in this separate document demonstrate complete metadata records for data sets generated by USDA. These examples can be used as a reference tool and guide for users responsible for collection, management, and maintenance of metadata.

For comparison, a complete FGDC Version 2 compliant set of metadata for a digital orthophoto quadrangle (DOQ) can be found at:

http://ortho.mit.edu/nsdi/metadata/213906.html

3.6.   Future standard directives

The ISO TC211 spatial metadata standard is pending adoption sometime during the 1999 calendar year. At that time, it will be suitable to transition the Standard for Geospatial Data Set Metadata to this new specification.

The ISO standard provides for two levels of conformance. Level 1 contains a minimal subset of metadata. Level 2 contains a much richer and more comprehensive set of metadata similar to the FGDC standard. However, unlike the FGDC standard, users are allowed, and encouraged to create their own metadata profiles to fit localized needs. At a minimum, these profiles need to meet conformance level 1 but may adopt all or some of the level 2 elements as desired.

Thus, the proposed Standard for Geospatial Data Set Metadata can be transitioned to an ISO Profile, conforming to level 1 but containing elements from level 2, specific to the Service Center Agencies' needs. All metadata collected under the guise of this standard prior to adoption to the ISO Profile shall be migrated into the new standard when necessary. No information will be lost or deleted during this transition. Metadata collection tools will support the transition from the FGDC standard to the ISO standard with little impact on the maintainers of the metadata.

One additional standard, which will have relevance to a Standard for Geospatial Data Set Metadata, is the Government Information Locator Service (GILS) Profile. This standard provides a mechanism to search for Government documents and data electronically. This document will also be reviewed to be certain that its salient required core elements are included in the ISO Profile definition. A preliminary review indicates that there are GILS elements, which are not mappable to either the FGDC or ISO standards. If GILS compliance is desired, this will need to be resolved.

4.   Geospatial metadata for the service center agencies

The standard is presented in a hierarchical format consisting of metadata elements and compound elements. The standard has seven sections used to capture information about a geospatial data set. Each section begins with a compound element that may contain several components. Compound elements appear in shaded gray and are not to be populated with metadata information, but serve to define the metadata elements that fall within that particular section. The numbers to the left of each compound element and

metadata element are used to represent the hierarchy in the section, and do not map to the hierarchy utilized in the FGDC standard.

4.1.   Identification information

This section captures basic information about the geospatial data set. Information that falls within this section includes citation information, descriptive text of the data set including an abstract and purpose, and temporal information regarding the creation of the data set.

Table 1—Identification information

Element name	Definition	Domain value/example
1. Identification_Information	*Basic information about the data set.*	
1.1. Citation		
1.1.1. Citation_Information	The recommended reference to be used for the data set.	
1.1.1.1. Originator	The name of an organization or individual that developed the data set.	Textual entry, should include the names of editors or compliers if information is available.
1.1.1.2. Publication_Date	The date when the data set is published or otherwise made available for release.	For example June, 1999.
1.1.1.3. Title	The name by which the data set is known.	For example, "Common Land Unit of Taylor, Texas".
1.2. Description	A characterization of the data set, including its intended use and limitations.	
1.2.1. Abstract	A brief narrative summary of the data set.	Example: "This data set was prepared by digitizing maps, by compiling information from a planimetric correct base and digitizing, or by revising digitized maps using remotely sensed and other information. The data set consists of georeferenced digital map data and computerized attribute data. This data set contains information that can be used in geospatial analysis for general planning purposes. The information can be applied to various types of site or suitability selection to aid land management decisions."
1.2.2. Purpose	A summary of the intentions with which the data set was developed.	Example: "This data set depicts information about features on or near the surface of the Earth depicting information about the distribution of the theme across the landscape. It can be used for general planning purposes in GIS analysis."

Element name	Definition	Domain value/example
1.3. Time_Period_of_Content	Time periods(s) for which the data set corresponds to the currentness reference.	
1.3.1. Time_Period_Information	Information about the date and time of an event. Use one of the following date recording methods: 1.3.1.1. Single_Date/Time or 1.3.1.2. Multiple_Dates/Times or 1.3.1.3. Range_of_Dates/Times	
1.3.1.1. Single_Date/Time	Means of encoding a single date and time.	
1.3.1.1.1. Calendar_Date	The year (and optionally month, or month and day).	The date should conform to the following format: YYYY for year only, YYYYMMDD if month and day information is available. An example for June 10, 1999 is 19990610 or simply 1999 if only year information is available.
1.3.1.1.2. Time_of_Day	The hour (and optionally minute, or minute and second) of the day. This item is useful for measurements that are time sensitive, for example, temperature and Global Positioning Systems (GPS).	Use "Unknown" when information is unavailable.
1.3.1.2. Multiple_Dates/Times	Means of encoding multiple individual dates and times	
1.3.1.2.1. Calendar_Date (R)	The year (and optionally month, or month and day).	The date should conform to the following format: YYYY for year only, YYYYMMDD if month and day information is available. An example for June 10, 1999 is 19990610 or simply 1999 if only year information is available.
1.3.1.2.2. Time_of_Day (R)	The hour (and optionally minute, or minute and second) of the day. This item is useful for measurements that are time sensitive, for example, temperature and GPS.	Use "Unknown" when information is unavailable.
1.3.1.3. Range_of_Dates/Times	Means of encoding a range of dates and times.	
1.3.1.3.1. Beginning_Date	The first year (and optionally month, or month and day) of the event.	The date should conform to the following format: YYYY for year only, YYYYMMDD if month and day information is available. An example for June 10, 1999 is

Element name	Definition	Domain value/example
		19990610 or simply 1999 if only year information is available.
1.3.1.3.2. Beginning_Time	The first hour (and optionally minute, or minute and second) of the day for the event.	Use "Unknown" when information is unavailable.
1.3.1.3.3. Ending_Date	The last year (and optionally month, or month and day) of the event.	The date should conform to the following format: YYYY for year only, YYYYMMDD if month and day information is available. An example for June 10, 1999 is 19990610 or simply 1999 if only year information is available.
1.3.1.3.4. Ending_Time	The last hour (and optionally minute, or minute and second) of the day for the event.	Use "Unknown" when information is unavailable.
1.3.2. Currentness_Reference	The basis on which the time period of content information is determined.	"publication date", "ground condition", "date of digitizing"
1.4. Status	The state of or maintenance information for the data set	
1.4.1. Progress	The state of the data set.	"Complete", "In Work", "Planned"
1.4.2. Maintenance_and_Update_ Frequency	The frequency with which changes and additions are made to the data set after the initial data set is completed.	"Continually", " Daily", "Weekly", "Monthly", "Annually", "Unknown", "As Needed", "Irregular", "None Planned", etc.
1.5. Spatial_Domain	The geographic areal domain of the data set.	
1.5.1. Bounding_Coordinates	The limits of coverage of a data set expressed by latitude and longitude values in the order western-most, eastern-most, northern-most, and southern-most. For data sets that include a complete band of latitude around the earth, the West Bounding Coordinate shall be assigned the value –180.0 and the East Bounding Coordinate shall be assigned the value 180.0. These values will be expressed in decimal degrees.	
1.5.1.1. West_Bounding_Coordinate	Western-most coordinate of the limit of coverage expressed in longitude (decimal degrees).	-180.0 <= West Bounding Coordinate <= 180.0
1.5.1.2. East_Bounding_Coordinate	Eastern-most coordinate of the limit of coverage expressed in longitude (decimal degrees).	-180.0 <= East Bounding Coordinate <= 180.0
1.5.1.3. North_Bounding_Coordinate	Northern-most coordinate of the limit of coverage expressed latitude (decimal degrees).	–90.0 <= North Bounding Coordinate <= 90.0; North Bounding Coordinate >= South Bounding Coordinate.

Element name	Definition	Domain value/example
1.5.1.4. South_Bounding_Coordinate	Southern-most coordinate of the limit of coverage expressed in latitude (decimal degrees).	-90.0 <= South Bounding Coordinate <= 90.0; South Bounding Coordinate <= North Bounding Coordinate
1.6. Keywords	Words or phrases summarizing an aspect of the data set.	
1.6.1. Theme	Subjects covered by the data set.	
1.6.1.1. Theme_Keyword (R)	Common use word or phrase used to describe the subject of the data set.	See Appendix B Table B.1 for the acceptable domain values list.
1.6.2. Place	Geographic locations characterized by the data set.	
1.6.2.1. Place_Keyword (R)	Geographic locations characterized by the data set.	Examples: State Name ("Virginia" or "VA"), County Name ("Frederick", "Frederick County"), State FIPS (2-digit code such as "51"), County FIPS (3-digit code, such as "069"), Quadrangle name ("Round Hill "), Quadrangle code (such as "O36078h7"), or OIP name, or OIP number (4-digit code).
1.7. Access_Constraints	Restrictions and legal prerequisites for accessing the data set. These include any access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the data set.	Generally, NRCS/FSA will use "None" as the domain value.

Element name	Definition	Domain value/example
1.8. Use_Constraints	Restrictions and legal prerequisites for using the data set after access is granted. These include any use constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on using the data set.	Example: "The U.S. Department of Agriculture, Natural Resources Conservation Service (or Aerial Photography Field Office or Farm Service Agency as appropriate), should be acknowledged as the data source in products derived from these data." "The data set is not designed for use as a primary regulatory tool permitting or citing decisions, but may be used as a reference source. This is public information and may be interpreted by organizations, agencies, units of government, or others based on needs; however, they are responsible for the appropriate application." "Photographic or digital enlargement of these maps to scales greater than at which they were originally mapped can cause misinterpretation of the data. These data and their interpretations are intended for planning purposes only".
1.9. Point_of_Contact	Contact information for an individual or organization that is knowledgeable about this data set. In most cases this may be the data steward.	
1.9.1. Contact_Information	Identity of, and means to communicate with, person(s) and organization(s) associated with the data set. Use either the contact person or contact organization.	
1.9.1.1. Contact_Person_Primary	The person, and the affiliation of the person, associated with the data set. Used in cases where the association of the person to the data set is more significant than the association of the organization to the data set. Use either: 1.9.1.1.1. Contact_Person_Primary or 1.9.1.2.1. Contact_ Organization_Primary	
1.9.1.1.1. Contact_Person	The name of the individual to	For example: "John Smith"

Element name	Definition	Domain value/example
	which to contact type applies. In many cases this may be the data steward.	
1.9.1.2. Contact_Organization_Primary	The organization, and the member of the organization, associated with the data set. Used in cases where the association of the organization to the data set is more significant than the association of the person to the data set.	
1.9.1.2.1. Contact_Organization	The name of the organization to which the contact applies.	Examples include: "USDA NRCS", "USDA APFO", USDA FS"
1.9.1.3. Contact_Address	The address for the organization or individual.	
1.9.1.3.1. Address_Type	The information provided by the address.	"mailing", "physical", "mailing and physical"
1.9.1.3.2. Address	An address line for the address.	For example: 100 S. Main St.
1.9.1.3.3. City	The city of the address	For example: Kansas City
1.9.1.3.4. State_or_Province	The state or province of the address.	For example: MO
1.9.1.3.5. Postal_Code	The ZIP or other postal code of the address.	For example: 20002
1.9.1.3.6. Country	The country of the address.	For example: USA
1.9.1.4. Contact_Voice_Telephone	The telephone number by which individuals can speak to the organization or individual.	For example: (202)555-1212
1.9.1.5. Contact_Facsimile_Telephone	The telephone number of a facsimile machine of the organization or individual.	For example: (202)555-1213
1.9.1.6. Contact_Electronic_Mail_Address	The address of the electronic mailbox of the organization or individual.	For example: smithj@usda.gov
1.10. Browse_Graphic	A graphic that provides an illustration of the data set. The graphic should include a legend for interpreting the graphic.	
1.10.1 Browse_Graphic_File_Name	Name of a related graphic file that provides an illustration of the data set. Include the Uniform Resource Locator (URL) and filename that point to the location of the graphic.	For example: http://www.usda.gov/soils.tif
1.10.2. Browse_Graphic_File_Description	A text description of the illustration.	Textual entry.
1.10.3. Browse_Graphic_File_Type	Graphic file type of related graphic file.	See Appendix B, Table B.2 for acceptable domain values list. Users should caveat the browse graphic file type domain value with the following file resolution

Element name	Definition	Domain value/example
		statement: "This image has been re-sampled to reduce the number of pixels for faster viewing", if this condition exists.

4.2. Data quality information

Data quality presents a general assessment of the quality of the data set. Information captured in this section includes an accuracy assessment of the horizontal and vertical position of the coordinates, the lineage, or events and parameters utilized during the construction of the data set, and information concerning the source material used to generate the data set.

Table 2—Data quality information

Element Name	Definition	Domain Value/Example
2. Data_Quality_Information	A general assessment of the quality of the data set.	
2.1. Positional_Accuracy	An assessment of the accuracy of the positions of spatial objects. The reported accuracy value is the cumulative result of all uncertainties, including those introduced by geodetic control coordinates, compilation, and final extraction of ground coordinate values in the spatial data.	
2.1.1. Horizontal_Positional_Accuracy	An estimate of accuracy of the horizontal positions of the spatial objects.	
2.1.1.1. Horizontal_Positional_Accuracy_ Report	An explanation of the accuracy of the horizontal coordinate measurements and a description of the tests used. Horizontal accuracy may be recorded according to NSSADA (National Spatial Data Accuracy). Horizontal spatial accuracy is defined by circular error of a data set's horizontal coordinates at the 95% confidence level. Report NSSADA accuracy in ground units (i.e., if the data set uses metric units, report accuracy in meters. Other map accuracy standards include RMSE (Root Mean Square Error) and ASPRS (American Society for Photogrammetry and Remote Sensing).	An example a of domain value for a horizontal positional accuracy report follows: "The accuracy of these digital data is based upon their compilation to base maps that meet National Map Accuracy Standards. The difference in positional accuracy between the digitized boundaries or points and the true feature locations is unknown." Use "According to Specifications" if appropriate.
2.1.2. Vertical_Positional_Accuracy	An estimate of accuracy of the vertical positions in the data set.	

Element Name	Definition	Domain Value/Example
2.1.2.1. Vertical_Positional_Accuracy_ Report	An explanation of the accuracy of the vertical coordinate measurements and a description of the tests used. Vertical accuracy may be recorded according to NSSADA (National Spatial Data Accuracy). Vertical spatial accuracy is defined by linear error of a data set's vertical coordinates at the 95% confidence level. Report NSSADA accuracy in ground units (i.e., if the data set uses metric units, report accuracy in meters.	Generally, the domain value for the vertical positional accuracy report of Service Center data will be "None".
2.2 Lineage	Information about the events, parameters, and source data which constructed the data set, and information about the responsible parties.	
2.2.1. Source_Information	List of sources and a short discussion of the information contributed by each.	
2.2.1.1. Source_Citation	Reference for a source data set.	
2.2.1.1.1. Citation_Information	The recommended reference to be used for the source material.	
2.2.1.1.1.1. Originator	The name of an organization or individual that developed the data set.	Examples include: "USDA NRCS", "USDA APFO", USDA FS" or "John Smith NCRS"
2.2.1.2. Source_Scale_Denominator	The denominator of the representative fraction on a map.	For example, on a 1:24,000-scale map, the source scale denominator is 24000.
2.2.1.3. Source_Time_Period_of_Content	Time period(s) for which the source data set corresponds to the ground.	
2.2.1.3.1. Time_Period_Information	Information about the date and time of an event Use one of the following date recording methods: 2.2.1.3.1.1. Single_Date/Time or 2.2.1.3.1.2. Multiple_Dates/Times or 2.2.1.3.1.3. Range_of_Dates/Times	
2.2.1.3.1.1. Single_Date/Time	Means of encoding a single date and time.	
2.2.1.3.1.1.1. Calendar_Date	The year (and optionally month, or month and day).	The date should conform to the following format: YYYY for year only, YYYYMMDD if month and day information is available.

Element Name	Definition	Domain Value/Example
		An example for June 10, 1999 is 19990610 or simp ly 1999 if only year information is available.
2.2.1.3.1.1.2. Time_of_Day	The hour (and optionally minute, or minute and second) of the day. This item is useful for measurements that are time sensitive, for example, temperature and Global Positioning Systems (GPS).	Use "Unknown" when information is unavailable.
2.2.1.3.1.2. Multiple_Dates/Times	Means of encoding multiple individual dates and times	
2.2.1.3.1.2.1. Calendar_Date (R)	The year (and optionally month, or month and day).	The date should conform to the following format: YYYY for year only, YYYYMMDD if month and day information is available. An example for June 10, 1999 is 19990610 or simply 1999 if only year information is available.
2.2.1.3.1.2.2. Time_of_Day (R)	The hour (and optionally minute, or minute and second) of the day. This item is useful for measurements that are time sensitive, for example, temperature and GPS.	Use "Unknown" when information is unavailable.
2.2.1.3.1.3. Range_of_Dates/Times	Means of encoding a range of dates and times.	
2.2.1.3.1.3.1. Beginning_Date	The first year (and optionally month, or month and day) of the event.	The date should conform to the following format: YYYY for year only, YYYYMMDD if month and day information is available. An example for June 10, 1999 is 19990610 or simply 1999 if only year information is available.
2.2.1.3.1.3.2. Beginning_Time	The first hour (and optionally minute, or minute and second) of the day for the event.	Use "Unknown" when information is unavailable.
2.2.1.3.1.3.3. Ending_Date	The last year (and optionally month, or month and day) of the event.	The date should conform to the following format: YYYY for year only, YYYYMMDD if month and day information is available. An example for June 10, 1999 is 19990610 or simply 1999 if only year information is available.
2.2.1.3.1.3.4. Ending_Time	The last hour (and optionally minute, or minute and second) of the day for the event.	Use "Unknown" when information is unavailable.

4.3.   Spatial data organization information

This section identifies the methodology used to capture the geospatial data in a digital
file.

Table 3—Spatial data organization information

Element name	Definition	Domain value/examples
3. Spatial_Data_Organization_ Information	The mechanism used to represent spatial information in the data set.	
3.1. Direct_Spatial_Reference_ Method	The system of objects used to represent space in the data set.	"Point", "Vector", "Raster"

4.4.   Spatial reference information

This section details the reference system used to capture and store geospatial coordinates.
Included in this clause is information concerning the definition of the coordinate system
including map projection or grid coordinate system where appropriate, units of measure
for the coordinates, and information concerning the geodetic model.

Table 4—Spatial reference information

Element Name	Definition	Domain Value/Examples
4. Spatial_Reference_Information	The description of the reference frame for, and the means to encode, coordinates in the data set.	
4.1. Horizontal_Coordinate_System_ Definition	The reference frame or system from which linear or angular quantities are measured and assigned to the position that a point occupies. Select one of the following two horizontal coordinate system models: Geographic or Planar	
4.1.1. Geographic	The quantities of latitude and longitude which define the position of a point on the Earth's surface with respect to a reference spheroid.	
4.1.1.1. Geographic_Coordinate_Units	Units of measure used for the latitude and longitude values.	"Decimal degrees", "Decimal minutes", "Decimal seconds", "Degrees and decimal minutes", "Degrees, minutes, and decimal seconds", "Radians", "Grads"

Element name	Definition	Domain value/examples
4.1.2. Planar	The quantities of distances, or distances and angles, which define the position of a point on a reference plane to which the surface of the Earth has been projected.	
4.1.2.1. Map_Projection	The systematic representation of all or part of the surface of the Earth on a plane or developable surface. Select from one of the following two Planar systems (Map Projection or Grid Coordinate System).	
4.1.2.1.1. Map_Projection_Name	Name of the map projection.	"Albers Conical Equal Area", "Azimuthal Equidistant", "Equidistant Conic", "Equi-rectangular", "General Vertical Near-sided Projection", "Gnomonic", "Lambert Azimuthal Equal Area", "Lambert Conformal Conic", "Mercator", "Modified Stereographic for Alaska", "Miller Cylindrical", "Oblique Mercator", "Orthographic", "Polar Stereographic", "Polyconic", "Robinson", "Sinusoidal", "Space Oblique Mercator", "Stereographic", "Transverse Mercator", "van der Grinten"
4.1.2.2. Grid_Coordinate_System	A plane-rectangular coordinate system usually based on, and mathematically adjusted to, a map projection so that geographic positions can be readily transformed to and from plane coordinates.	
4.1.2.2.1. Grid_Coordinate_System_Name	Name of the grid coordinate system. Select one of the following systems: 4.1.2.2.1.1. Universal_Transverse_Mercator or 4.1.2.2.1.2. State_Plane_Coordinate_System	

Element name	Definition	Domain value/examples
4.1.2.2.1.1. Universal_Transverse_Mercator	(UTM) a grid system based on the transverse Mercator projection, applied between latitudes 84 degrees north and 80 degrees south on the Earth's surface.	
4.1.2.2.1.1.1. UTM_Zone_Number	Identifier for the UTM zone.	Values for the northern hemisphere fall within 1 <= UTM zone <= 60. Values for the southern hemisphere fall within -60 <= UTM zone <= -1.
4.1.2.2.1.2. State_Plane_Coordinate_System	(SPCS) a plane-rectangular coordinate system established for each state in the United States by the National Geodetic Survey.	
4.1.2.2.1.2.1. SPCS_Zone_Identifier:	Identifier for the SPCS zone.	Use the four-digit numeric codes for the SPCS zone based on the North American Datum (NAD) of 1927 or NAD 1983 depending on applicability. Include one of the following domain values: "Lambert Conformal Conic", "Transverse Mercator", "Oblique Mercator", "Polyconic".
4.1.2.3. Planar_Coordinate_Information	Information about the coordinate system developed on the planar surface.	
4.1.2.3.1. Planar_Distance_Units	Units of measure used for distances.	Examples include: "meters", "international feet", "survey feet"
4.1.3. Geodetic_Model	Parameters for the shape of the earth.	
4.1.3.1. Horizontal_Datum_Name	The identification given to the reference system used for defining the coordinates of points.	Select either "North American Datum of 1927" or "North American Datum of 1983".
4.1.3.2. Ellipsoid_Name	Identification given to established representations of the Earth's shape.	Select either "Clarke 1866" or "Geodetic Reference System 80"

4.5.   Entity and attribute information

This section documents the composition of the data set including information concerning the delineation of features and the characteristics (attributes) of those features. Included in this description are the names of the attributes and the codes, if any used to store the attribute values in the database. Additional information concerning the complete description of the data and its associated attributes is provided in this section.

Table 5—Entity and attribute information

Element Name	Definition	Domain Value/Examples
5. Entity_and_Attribute_ Information	Details about the information content of the data set, including the entity types, their attributes, and the domains from which attribute values may be assigned.	
5.1 Overview_Description	Summary of and citation to detailed description of, the information content of the data set.	
5.1.1. Entity_and_Attribute_Overview (R)	Detailed summary of the information contained in a data set.	Textual description of attributes. For example: taxclass (taxonomic classification) - stores the taxonomic classification for soils in the database.
5.1.2 Entity_and_Attribute_Detail_ Citation (R)	Reference to the complete description of the entity types, attributes, and attribute values for the data set.	Textural reference to where the complete descriptions may be found. U.S. Department of Agriculture. 1975. Soil Taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conservation Service, U.S. Department of Agriculture Handbook 436.

4.6.   Distribution information

This section details information concerning the accessibility and distribution of the data set. Metadata elements capture the person or organization responsible for releasing the data set, the contact information for that person or organization, and information concerning the available methods of distribution.

Table 6—Distribution information

Element name	Definition	Domain value/examples
6. Distribution_Information	Information about the distributor of and options for obtaining the data set.	
6.1. Distributor	The party from whom the data set may be obtained.	
6.1.1. Contact_Information	Identity of, and means to communicate with, person(s) and organization(s) associated with the data set. Use either the contact person or contact organization.	
6.1.1.1. Contact_Organization_ Primary	The organization, and the member of the organization, associated with the data set. Used in cases where the association of the	

Element name	Definition	Domain value/examples
	organization to the data set is more significant than the association of the person to the data set. Populate either: 6.1.1.1.1. Contact_Organization or 6.1.1.1.2. Contact_Person	
6.1.1.1.1. Contact_Organization	The name of the organization to which the contact type applies.	Examples include: "USDA NRCS", "USDA APFO", USDA FS"
6.1.1.1.2. Contact_Person	The name of the individual to which the contact type applies. In many cases this may be the data steward.	For example: "John Smith"
6.1.1.2. Contact_Address	The address for the organization or individual point of contact.	
6.1.1.2.1. Address_Type	The information provided by the address.	Examples include, "mailing", "physical", "mailing and physical".
6.1.1.2.2. Address	An address line for the address.	For example: 100 S. Main St.
6.1.1.2.3. City	The city of the address.	For example: Kansas City
6.1.1.2.4. State_or_Province	The state or province of the address.	For example: MO
6.1.1.2.5. Postal_Code	The ZIP or other postal code of the address.	For example: 20002
6.1.1.2.6. Country	The country of the address.	For example: USA
6.1.1.3. Contact_Voice_Telephone	The telephone number by which individuals can speak to the organization or individual.	For example: (202)555-1212
6.1.1.4. Contact_Facsimile_Telephone	The telephone number of a facsimile machine of the organization or individual.	For example: (202)555-1213
6.1.1.5. Contact_Electronic_Mail_ Address	The address of the electronic mailbox of the organization or individual.	For example: smithj@usda.gov
6.2. Standard_Order_Process	The common ways in which the data set may be obtained or received, and related instructions and fee information.	
6.2.1. Digital_Form	The description of options for obtaining the data set on computer-compatible media.	
6.1.2.1. Digital_Transfer_Information	Description of the form of the data to be distributed.	
6.2.1.1.1. Format_Name	The name of the data transfer format.	See Appendix B Table B.3 for acceptable domain values list.
6.2.1.2. Digital_Transfer_Option	The means and media by which a data set is obtained from the distributor.	
6.2.1.2.1. Online_Option	Information required to directly obtain the data set electronically.	
6.2.1.2.1.1. Computer_Contact_Information	Instructions for establishing communications with the distribution computer.	
6.2.1.2.1.1.1. Network_Address	The electronic address from which the	

Element name	Definition	Domain value/examples
	data set can be obtained from the distribution computer.	
6.2.1.2.1.1.1.1. Network_Resource_Name	The name of the file or service from which the data set can be obtained. Include URL path and filename.	For example: http://www.usda.gov/ soils.e00
6.2.1.2.2. Offline_Option	Information about the media -specific options for receiving the data set.	
6.2.1.2.2.1. Offline_Media	Name of the media on which the data set can be received.	"CD-ROM", "3-1/2 inch floppy disk", "9-track tape", "4 mm cartridge tape", 8 mm cartridge tape", "1/4-inch cartridge tape"

4.7.   Metadata reference information

This section details information concerning the currentness of the metadata record and the standard that was used to capture this information.

Table 7—Metadata reference information

Element name	Definition	Domain value/examples
7. Metadata_Reference_Information	Information on the currentness of the metadata information, and the responsible party.	
7.1. Metadata_Date	The date that the metadata were created or last updated.	For example: "Last updated on 19990610"
7.1.1. Metadata_Standard_Name	The name of the metadata standard used to document the data set.	Example: "FGDC Version 2.0 – USDA Service Center Metadata Standard 1.0"

Appendix A–Bibliography

[A1]   FGDC-STD-001-1998, Federal Geographic Data Committee. Content standard for digital geospatial metadata (revised June 1998). Federal Geographic Data Committee. Washington, D.C.

Appendix B–Domain value tables

Table B.1—Theme keyword domain values

Domain value	Synonyms
Cadastral	PLSS
Climate/ Precipitation	Rain, snow
Climate/ Temperature	Temp
Common Land Unit	CLU
Demographics	Population
Digital Raster Graphs	DRG
Elevation	Contour, contours
Geographic Names Information System	GNIS
Government Units	GU
Hydrography	Streams, lakes, wells
Hydrologic Unit	HU
Land Use Land Cover	LU LC, LU/LC
Orthophoto Imagery	DOQ, DOQQ
Plants	Not defined yet
Quad Boundaries	Quad, DRG
Soils	SSURGO
Transportation	Roads, railroads
Wetlands	NWI
Conservation Planning	CP

Table B.2—Browse graphic file type domain values

Domain value	Definition
CGM	Computer Graphics Metafile
EPS	Encapsulated Postscript format
EMF	Enhanced Metafile
GIF	Graphic Interchange Format
JPEG	Joint Photographic Experts Group Format
PBM	Portable Bit Map format
PS	Postscript format
TIFF	Tagged Image File Format
WMF	Windows metafile
XWD	X-Windows Dump

Table B.3—Format name domain values

Domain value	Definition
ARCE	ARC/INFO Export format
ARCG	ARC/INFO Generate format
ASCII	ASCII file, formatted for text attributes, declared format
BIL	Imagery, band interleaved by line
BIP	Imagery, band interleaved by pixel
BSQ	Imagery, band interleaved sequential
CDF	Common Data Format
CFF	Cartographic Feature File (U.S. Forest Service)
COORD	User-created coordinate file, declared format
DEM	Digital Elevation Model format (U.S. Geological Survey)
DFAD	Digital Feature Analysis Data (National Imagery and Mapping Agency)
DGN	Microstation format (Intergraph Corporation)
DIGEST	Digital Geographic Information Exchange Standard
DLG	Digital Line Graph (U.S. Geological Survey)
DTED	Digital Terrain Elevation Data (MIL-D-89020)
DWG	AutoCAD Drawing format
DX90	Data Exchange '90
DXF	AutoCAD Drawing Exchange Format
ERDAS	ERDAS image files (ERDAS Corporation)
GRASS	Geographic Resources Analysis Support System
HDF	Hierarchical Data Format
IGDS	Interactive Graphic Design System format (Intergraph Corporation)
IGES	Initial Graphics Exchange Standard
MOSS	Multiple Overlay Statistical System export file
netCDF	network Common Data Format
NITF	National Imagery Transfer Format
RPF	Raster Product Format
RVC	Raster Vector Converted format (MicroImages)
RVF	Raster Vector Format (MicroImages)
SDTS	Spatial Data Transfer Standard (Federal Information Processing Standard 173)
SIF	Standard Interchange Format (DOD Project 2851)
SLF	Standard Linear Format
TIFF	Tagged Image File Format
TGRLN	Topologically Integrated Geographic Encoding and Referencing (TIGER) Line Format
VPF	Vector Product Format (National Imagery and Mapping Agency")